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AN ACCOUNT OF THE VINCELONIAN VOLCANO.

BY BENJAMIN SHARP, M. D.

In no island of the West Indies, and probably nowhere in the world does the student of vulcanology find, in so small a compass, such a field for interesting research as in the island of St. Vincent.

If we take a boat and row from Kingstown, the capital, up the leeward or western coast, we find the slopes of the volcanic hills carved into deep valleys, which are separated from each other by vast lava streams. The ends of these have been cut off by the never-ceasing action of the sea and form perpendicular and often beetling cliffs, from one hundred to one hundred and fifty feet high. On these cliff faces we may read the expression of volcanic action, study the character and extent of the ejections and note the different periods of the eruptions.

At the foot of the cliff, where the sea has gnawed a deep groove, there are large stones varying from the size of one's fist to a foot or more in diameter. These were thrown from the crater first. Above this layer and filtering between the larger boulders, is a stratum of ash or mud which came down with the heavy rains that generally set in soon after the eruption has begun. The mud is now hardened into a compact mass enclosing the small boulders. Resting on the ash layer and often many feet in thickness, is the solidified lava.

On the top of the spur, in the loose soil that covered the lava, grow rank grasses; giant Cerei raise their gaunt candelabral forms, and Florida moss, or as they call it here, "old man's beard," droops from the many crevices.

About a mile from the beach, at the mouth of the Cumberland Valley, is a fine exposure of basalt, Pl. IV, fig. 1. The cliff, formed of basaltic columns, faces the north, and forms the southern wall of the valley, which runs east and west. The columns of basalt vary from two to three feet in diameter and run perpendicularly to the top of the cliff, which is about one hundred and fifty feet high. At its foot runs a small stream, known as the Cumberland river. There is no doubt but that this great lava stream extended across the head of the valley which at this point is a mile and a half wide, but what causes have been active in removing this enormous mass of material, I was unable to determine.

Just before reaching Chateau Belair, a little village, which strongly suggests a Swiss dorf, we pass through a break in a lava stream, which has flowed down the western slope of the island. It is made up wholly of basaltic columns, not so regular nor so large as those of the Cumberland valley, but smaller, more broken and slanting toward the sea at about an angle of 45° .

The Souffriere or volcano of St. Vincent forms the northern side of Wallabou valley, through which a stream of water wanders by great black boulders of lava. The sides of the valley are everywhere clothed with deep green primeval wood; here and there a tree fern spreads its softer green over the dark verdure, the crown of delicate fronds appearing at a distance like light green shields, laid upon the green hill side. Luxuriant vines and long lians or air plants, pour over the face of a perpendicular cliff, from the dark wave of forest that rolls back from its edge. After passing into this valley, the path leads to the north and we begin our ascent, on a ridge of a great lava stream, which leads to the crater, three thousand feet above us. The path on this spur is at times not more than a few feet wide and as we ascend we look on each side into a deep abyss of green. The cool wind from the peaks above, shoots in gusts about us and speeds away down the gorges; ruffling in its course the broad flat leaves of the trumpet tree which cause a spot of frosted silver to gleam on the dark green waste.

Winding past huge forest trees, the path is walled with broad-leaved Balisiers or wild bananas, the moisture dripping from their bright yellow spathes. We are obliged at times to tear our way through masses of pink and white Begonias; the wild tropical expressions of our diminutive hot-house plants.

About two thousand feet above the valley, the path widens into a level spot, shaded by two immense fig-trees; great "beard" hang from their branches, some still swinging in the wind while others have just taken root in the ground, and others still, having been long rooted, one of goodly size and are partially welded to the main trunk. These are called the "Maroon trees" and the spot is the resting ground for travellers going over "the hill" as the Vincelonians call this great mountain.

The path now becomes steeper; the tropical vegetation begins to lose its richness and to give place to more stunted forms; trees are replaced by bushy growth and the woods begin to resemble open northern scrub; mosses and lichens take the place of the huge dripping

parasites of the forest below; the bush soon gives way to rough ferns and grasses, and here and there a black charred tree stem, shows us that we are nearing a sulphurous atmosphere. The path is now much steeper and more difficult to ascend as the earth and rock is covered with loose stones and scoria.

At last we come to an artificial cave shaded with ferns and creeping mimosa-like vines. A short distance above this we are on the brink of the crater, about 3700 feet above the level of the sea. Southward, stretching from our feet, is a carpet of bright green, which blends, a few hundred feet below, into the dark green of the forest. Opposite the mountain on which we stand, rises a vast green wall, a mountain 2500 feet high. This mountain slopes on either side to the sea coast of the island and forms the southern boundary of the transinsular valley of the Wallabou. Far below us we can see Chateau Belair, a mere speck on the curve of the blue bay and rolling away to the south, the foot hills melt into the deep Caribbean Sea.

Turning to the north, the crater and its lake open before us, Pl. IV, fig. 2. A blue sheet of water, set in a circular frame five hundred feet deep and a mile in diameter. On the steep sides, where the Souffriere bird whistles his ventriloquial notes, grow tall weeds and rank grasses; whiffs of sulphurous vapor come to us from the surface of the lake and wreaths of cottony mist form and vanish before our eyes.

Passing along the eastern rim of the Old Crater, which gradually rises in elevation, we come to a spot where a view of the New Crater may be obtained. There is no appearance of an ash cone so marked in the Vesuvian volcano; the ash and scoria have been washed away by the torrential rains of the rainy seasons. Along the path leading to the rim, and on the rim itself, boulders of lava and collections of pumice stone may be observed, but loose ash is nowhere to be discovered. Some may have remained but it has disintegrated and formed a soil which now supports rank weeds, scattering bushes and a coarse grass.

The New Crater was formed during the memorable eruption of 1812, where the eruptive force, instead of relieving itself by the old channel, broke for itself a new one, on the northern slope of the Old Crater. A wall separates these two openings—the northern face of which is a perpendicular rock. Its upper edge is like a knife edge and impossible to travel over; it slopes directly south into the Old Crater, north it drops a sheer 700 feet into the new one,

and from its base the land slopes some 300 feet to the bottom of the crater.

The lake in the Old Crater has been found to be about 100 fathoms deep (600 feet) making the depth of the crater about 1100 feet. It would appear to be about the same depth as the new one. Whether there be an outlet, or whether sufficient time has not elapsed since the formation of the New Crater, no water, save a shallow pond some two or three feet in depth, is found here.

As has been stated the Old Crater is an mile in diameter, and judging by the eye it is a perfect circle. The New Crater is about a mile and a half in diameter and quite irregular, a point to the north rising to 4000 feet, which is said to be the highest point on the island of St. Vincent.

The first recorded eruption of the Vincelonian Souffriere was in 1718 and has been described by Moreau de Jonnès. According to him the eruption was preceded by violent earthquakes. Loud subterranean noises were heard in the vicinity of a mountain which, he states, was situated at the eastern end of the island. This outburst must have been the most violent that St. Vincent has ever suffered, for besides the phenomena usually accompanying a volcanic eruption, the whole mountain must have been blown away. This statement of Jonnès is substantiated by the fact that no mountain, or any trace of one, now exists on the eastern side of the island. The Souffriere where the Old and New Craters are found, is situated at the northern extremity of a ridge, running north and south through the middle of the island, and from this ridge, the land slopes east and west to the sea, the windward or eastern slope being more gradual than the leeward or western, which is rugged and precipitous.

The destruction of this eastern mountain of Jonnès, probably accounts for the difference found in the older authorities as to the height of St. Vincent; Scrope (before 1718) gives the height of the island as 4,940 feet, while the present maps give it about 4,000.

There seems to have been a slight eruption at St. Vincent in 1785.

From the beginning of the year 1811 and lasting until 1813 an area of over six million square miles was affected by earthquakes and disturbed by subterranean noises. The enormous pressure that caused these tremblings of the earth was relieved by the eruption at St. Vincent, about the first of May, 1812. This area extended from the Azores in the east to the Mississippi valley in the west,

and from the valley of the Ohio in the north almost to the Amazon valley in the south.

On the 30th of January, 1811, near the Azores there rose from the surface of the sea a sub-marine volcano, which by the 15th of June, 1812 had risen 320 feet above the sea level.

About the beginning of the year 1812, the valley of the Mississippi was the seat of frequent earthquakes, which often rapidly succeeded one another, but more feeble and less frequent east of the Alleghenies.

"The shock felt at Caraccas," says Humboldt "in the month of December, 1811 was the only one that preceded the horrible catastrophe of the 26th of March, 1812." The day on which the destruction of the city occurred was a remarkably hot one. "The air was calm and the sky unclouded. It was Holy Thursday and a great part of the population was assembled in the churches. Nothing seemed to presage the calamities of the day. At seven minutes after four in the afternoon, the first shock was felt; it was sufficiently powerful to make the bells of the churches toll; it lasted five or six seconds during which time the ground was in a continual undulating movement, and seemed to heave up like a boiling liquid. The danger was thought to be past, when a tremendous subterranean noise was heard, and of longer continuance than that heard within the tropics in the time of storms. This noise preceded a perpendicular motion of three or four seconds, followed by an undulatory movement, somewhat longer. The shocks were in different directions from north to south and east to west. Nothing could resist the movement from beneath upward and undulations crossing each other. The town of Caraccas was entirely overthrown. Between nine and ten thousand inhabitants were buried under the ruins of the houses and churches. The churches of La Trinidad and Alta Gracia, which were more than one hundred and fifty feet high and the naves of which were supported by pillars of twelve or fifteen feet in diameter, left a mass of ruins scarcely five or six feet in elevation. The whole of the earthquakes, that is to say the whole of the movement of undulation and rising, which occasioned the horrible catastrophe of the 26th of March, 1812 was estimated at fifty seconds, by others at one minute and twelve seconds."

Seven large towns lying west of Caraccas and extending into the Columbian Republic, were destroyed by the same earthquake, and

it was felt at Santa Fe de Bogota, nearly six hundred miles west of Caraccas.

One month and one day (*i. e.*, the 27th of April) after the destruction of Caraccas, the relief of this great pressure began. The great smoking mountain of Guadeloupe lay quiet, the craters of Dominica and Martinique were not affected, nor was there any commotion exhibited in the St. Lucian Souffriere. The eruption was so sudden, so rapid and so powerful that instead of clearing a way for itself in the old crater of St. Vincent, it burst from the northern side of that mountain and formed what is now known as the New Crater.

"A negro boy," so a story goes, "was herding cattle on the mountain side. A stone fell near him; and then another. He fancied that other boys were pelting him from the cliffs above, and began throwing stones in return. But the stones fell thicker; and among them one and then another, too large to have been thrown by human hand. And the poor little fellow woke up to the fact that not a boy, but the mountain, was throwing stones at him, and that the column of black cloud which was rising from the crater above was not harmless vapor, but dust and ash and stone."¹

For three days and three nights the eruption continued increasing in energy, until the island was enveloped in Stygian darkness by the falling ashes. On the 30th, the lava came and, welling from the crater, rolled to the sea, which it reached in four hours.

The ash and scoria accumulated in such quantities in one of the eastern valleys, that the Rabaca river ceased to flow, and its bed, where water is now seen only in the wet season, is known as the "Dry River." Water constantly flows to the sea over the old course of the river but it is hidden by the great quantity of scoria lying in the old bed, and only after very heavy rains does it rise above this porous material.

The mass of material thrown out from this single vent relieved an area of the earth's crust nearly as large as that of Europe.

During the eruption of the Vincelonian volcano, subterranean noises were heard at Caraccas, a distance equal to that which lies between Boston and Washington. Not only were the inhabitants of Caraccas terrified by the noises, but also those who were in the midst of the llanos which cover a space of over 36,000 square miles. No shock seemed to accompany these noises and at Caraccas and Cala-

¹ Kingsley's At Last.

bazoo the inhabitants supposed an enemy to be advancing with heavy artillery and they prepared to put their cities in defence.

One of the harmless effects of this terrible explosion was noticed in Barbados, which island lies ninety-five miles to the windward of St. Vincent. The day following the eruption (May 1st), a sound resembling heavy cannonading was heard to the eastward; the inhabitants of course supposed the English and French fleets to be engaged in battle; at sunset the cannonading died away. The next morning the sun did not appear to rise; the island was enveloped in darkness, which increased as time advanced. The negroes imagined that the Day of Judgment had come and rushed in a panic to the churches. Nor were the whites any wiser, they too were seized by the panic started by the blacks and rushed with them to their places of worship.

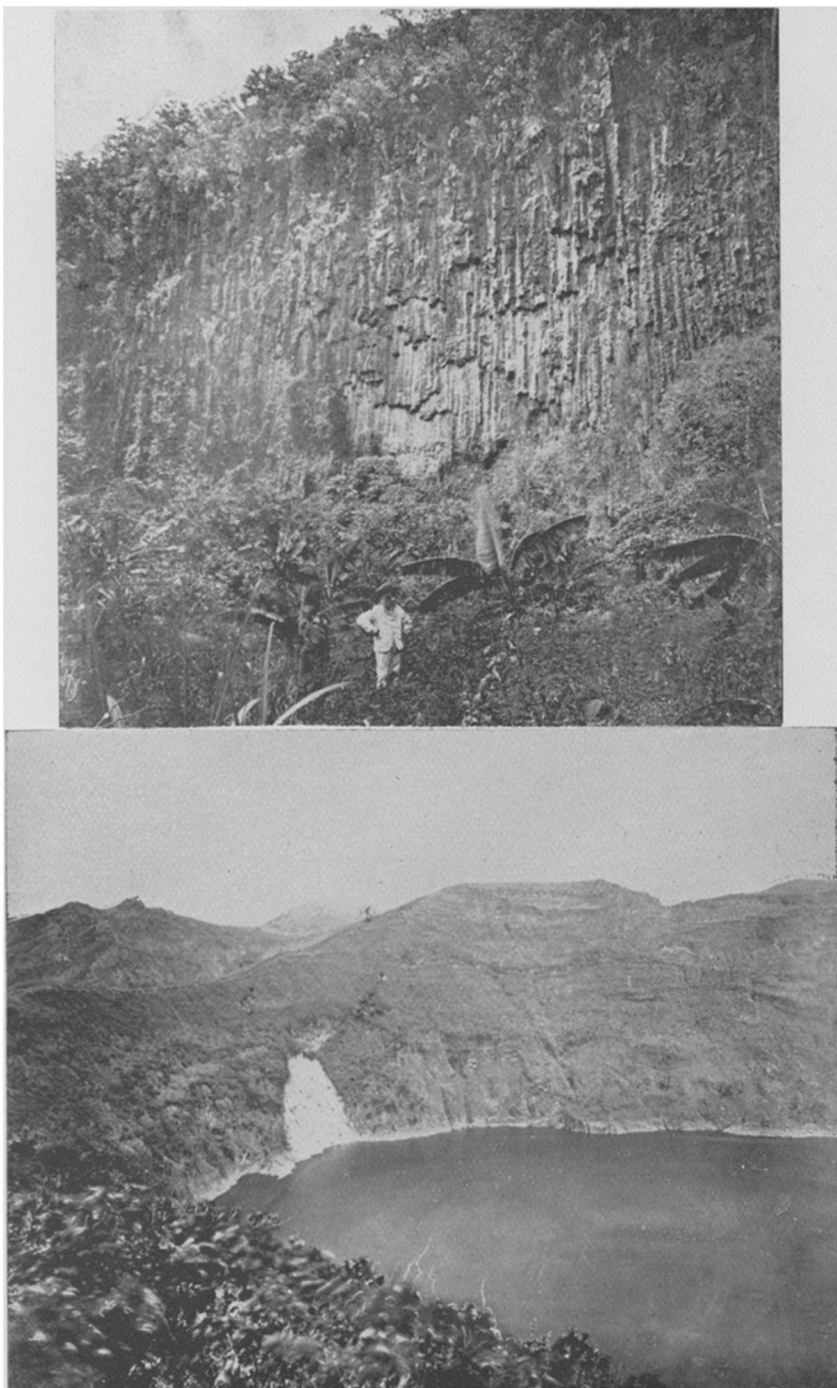
A heavy, quiet rain of impalpable powder fell over the island; the trade wind blew not, the roar of the surf had died away; the dead quiet was only broken by the fall of some tree, crushed to the earth by the weight of the amassing dust.

Sir Joseph Banks awoke that morning and found everything shrouded in darkness; he went to the window to open it, but could not; he felt the ash that had sifted in upon the sill, and said: "The volcano of St. Vincent has broken out at last and this is the dust of it."

EXPLANATION OF PLATE IV.

Fig. 1. View of basaltic columns of Cumberland Valley, St. Vincent, B. W. I.

Fig. 2. View of the Vincelonian crater looking north-west.



SHARP, ON VINCELONIAN VOLCANO.